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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/921,358	08/02/2001	Tomoharu Kurita	212865	6028

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EXAMINER

KRUER, KEVIN R

ART UNIT PAPER NUMBER

1773

DATE MAILED: 03/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/921,358

Applicant(s)

KURITA ET AL.

Examiner

Kevin R. Kruer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-5,7 and 18-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,7 and 18-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 1-5, 7, and 18-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al (US 3,936,575) in view of Frost (US 3,984,375), Akahoshi (US 4,970,107), and Lu (US 3,897,393) has been overcome by argument. As noted by Applicant in the response of February 27, 2006, Frost does not teach the claimed polymer of formula (I) of claim 1.
3. Claims 1-5, 7, and 18-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al (US 3,936,575) in view of JP 03131630A (herein referred to as "Uno"), Akahoshi (US 4,970,107), and Lu (US 3,897,393)

Watanabe teaches a metal-clad laminate for flexible printed circuit boards comprising a resin selected from polyvinyl chloride, polyamide-imide, and polyimide (col 1, lines 9+). The conductive foils utilized in such laminates are conductive foils with a thickness of 15-110um (col 9, lines 53+).

Watanabe does not teach a polyamide-imide resin that reads on the claimed "heat resistant resin." However, Uno teaches a polyamide-imide resin consisting essentially of a repeating unit depicted by the formula (I) of claim 1 (see claim 2 of Uno). The polyamide-imide possesses thermal stability, mechanical properties, and electrical properties (abstract). The polymer is useful as a film for electrical insulation in printed circuit boards (abstract). Thus, it would have been obvious to one of ordinary skill in the

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ad at the time the invention was made to utilize the polyimide-amide polymers taught in Uno as the resin in the printed circuit board taught in Watanabe. The motivation for doing so would have been that said polymers possess thermal stability, mechanical properties, flexibility, and electrical properties.

Neither Watanabe nor Uno teaches that the surface of the heat resistant resin that contacts the metal layer should have the claimed surface roughness. However, Akahoshi teaches that a copper layer for a printed circuit board may be surface roughened so that it has pit-like recesses with diameters of from about 0.1-1  $\mu\text{m}$  (col 1 , lines 6+). Said roughness improves adhesion. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to roughen the copper layer of the printed circuit board taught in Watanabe so that it had a roughness of 0.1-1  $\mu\text{m}$ . The motivation for doing so would have been to improve adhesion between the resinous layer and the copper layer.

Neither Watanabe nor Uno teaches that the polyimide polymer should have the claimed insoluble content. However, Lu teaches polyimides may be cured at elevated temperatures to further improve their physical, chemical, and thermal properties. When cured, the polyimide polymers become insoluble in cresol (col 4, lines 54+). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to cure the polyimides taught by Uno. The motivation for doing so would have been to improve their physical, chemical, and thermal properties. Once cured, the polymer is understood to inherently meet the claimed insoluble content limitations.

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With respect to the claimed initiation tear strength, elastic modulus retentivity, dimensional stability, sold heat resistance, adhesion, and radius of curvature, of the claimed "heat resistant polymer," the examiner takes the position that the laminate taught by Watanabe in view of Uno necessarily possess said properties because said laminate comprises the same layers, having the same composition and laminated in the same relative order as the claimed laminate.

With respect to the method limitations of claim 1 that the laminate is produced by "applying a solution containing an organic solvent and a condensation polymer to the metal foil and drying the laminate," the examiner notes that the method of making a claimed product does not patentably distinguish a claimed product from the product taught in the prior art unless it can be shown that the method of making the product inherently results in a materially different product. In the present application, no such showing has been made. The examiner takes the position that the laminate taught by Watanabe in view of Uno reads on the claimed laminate because it comprises the same layers, having the same composition and laminated in the same relative order as the claimed laminate. The laminate taught by Watanabe in view of Uno is understood to read on the laminates claimed in claims 2 and 3 for similar reasons.

### ***Response to Arguments***

Applicant's arguments filed February 27, 2006 have been fully considered but are moot in view of the newly applied rejections. In order to expedite prosecution, the examiner will take this opportunity to respond to applicant's arguments that may be relevant to the newly applied rejection.

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Applicant argues the surface roughness of the copper layer taught in Akahoshi is not equivalent to the claimed surface roughness of the resin film layer. The examiner respectfully disagrees. When a foil with said roughness is applied to a resinous substrate, the resin will adopt the roughness of the adjacent foil.

With respect to Lu, Applicant argues the polymers disclosed in Lu have "significant structural and chemical distinctions from the polyamide-imide required in the pending claims. As such, Lu is non-analogous and would not render obvious the claimed limitation. The examiner respectfully disagrees. The relied upon teachings of Lu are directed to polyimide films in general, not polyimides of any particular "structural or chemical distinctions." The examiner maintains the polyamide-imides of Uno are sufficiently similar to the polyimides taught in Lu that the skilled artisan would readily extend the teachings of Lu to the polyamide-imides of Uno.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin R. Kruer whose telephone number is 571-272-1510. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin R. Kruer  
Patent Examiner-Art Unit 1773